

THURSDAY, MARCH 21, 1889.

BAKU PETROLEUM.

The Region of the Eternal Fire. By Charles Marvin.
(London: Allen and Co., 1888.)

THIS book is not, as its title might imply, an eschatological treatise, nor is it a work of fiction after the manner of Mr. Rider Haggard. It is simply a plain, straightforward narrative of a journey to the petroleum region of the Caspian, undertaken with a view of investigating what Mr. Marvin terms "the kerosene factor of the Central Asian problem." It has, however, this connection with eschatology, that the region of which it treats is, or was, holy ground. The peninsula of Apsheron, on which Baku stands, has been famous from time immemorial, and even before the time of Cyrus thousands of the followers of Zoroaster had worshipped on its sacred soil. With the conquest of Persia, first by Heraclius, and twelve years later by the Arabs, the power of the Magi of the Zoroastrian sect was shattered; and the worship of the Eternal Fire in the Surakhani temple for ever passed away, and in its place are now the symbols of a new cult in the shape of greasy derricks and dingy kerosene distilleries.

The story of Baku and its Oil King, Ludwig Nobel, reads like a tale of the "Arabian Nights." Ten years ago the place was a sleepy Persian town: it is now a thriving city, owning more shipping than Cronstadt or Odessa, and the centre of a vast and rapidly increasing trade. But even in the thirteenth century the "sacred element" was so far robbed of its sanctity that the crude petroleum was extensively exported into various parts of Asia. In "The Book of Ser Marco Polo, the Venetian," edited by Colonel Yule, we read that—

"On the confines towards Georgine there is a fountain from which oil springs in great abundance, inasmuch as a hundred shiploads might be taken from it at one time. This oil is not good to use with food, but 'tis good to burn, and is also used to anoint camels that have the mange. People come from vast distances to fetch it, for in all countries round there is no other oil."

Jonas Hanway, to whom Englishmen must be for ever grateful for the introduction of the umbrella to this country, visited Baku about the middle of the eighteenth century in the interest of one of the powerful trading companies of the time; and in 1754 he published a very complete account of the district and of the uses to which its naphtha or petroleum was put. The oil was then, as now, mainly employed for light and fuel, but we are also told that—

"The Russians drink it both as a cordial and medicine; but it does not intoxicate. If taken internally, it is said to be good for the stone as also for disorders of the breast. . . . Externally applied it is of great use in scorbutic pains, gouts, cramps, &c., but it must be put to the part affected only; it penetrates instantaneously into the blood, and is apt for a short time to create pain. It has also the property of spirits of wine to take out greasy spots in silks or woollens, but the remedy is worse than the disease, for it leaves an abominable odour. They say it is carried into India as a great rarity, and being prepared as a japan is the most beautiful and lasting of any that has yet been found."

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Since that time Baku and its wonders have been frequently described, and the importance of the place with respect to the Central Asian question has been repeatedly pointed out by such travellers as Marsh, Valentine Baker, O'Donovan, and Arnold. Up to 1872 the extraction of the oil was a monopoly, but in the following year it was thrown open to the world, and hundreds of wells have since been sunk, mainly by the energy of Swedes and Russians. Geologically speaking, practically nothing is known about this extraordinary district, and even the engineers who bore for the oil and work the wells are ignorant of the conditions which affect the supply of petroleum. At the present time there must be at least five hundred wells and fountains situated close together on less than a thousand acres of ground, but the sources seem to be absolutely independent of each other. The supply is simply (to use Dominie Sampson's word) "prodigious"; and every year, as the borings get deeper, the fountains become more prolific. These borings are nothing like so deep as in America: not a single Baku well has yet approached a depth of 1000 feet. In 1883 two flowing wells each sent out nearly 30,000,000 gallons in less than a month from a depth of 700 feet. In America there are said to be 25,000 drilled petroleum wells, but a single Baku well has thrown up as much oil in a day as nearly the whole of the 25,000 in America put together. Mr. Marvin thus describes one of these "spouting" wells:—

"In Pennsylvania that fountain would have made its owner's fortune; there's £5000 worth of oil flowing out of the well every day. [The actual value was at least £11,200 a day.] Here it has made the owner a bankrupt.' These words were addressed to me by an American petroleum engineer, as I stood alongside a well that had burst the previous morning, and out of which the oil was flying twice the height of the Great Geyser in Iceland, with a roar that could be heard several miles round. The fountain was a splendid spectacle—it was the largest ever known at Baku. . . . The derrick itself was 70 feet high, and the oil and sand, after bursting through the roof and sides, flowed fully three times higher, forming a greyish-black fountain, the column clearly defined on the southern side, but merging into a cloud of spray 30 yards broad on the other. . . . The diameter of the tube up which the oil was rushing was 10 inches. On issuing from this the fountain formed a clearly-defined stem, about 18 inches thick, and shot up to the top of the derrick, where, in striking against the beam, which was already worn half through by the friction, it got broadened out a little. Thence, continuing its course more than 200 feet high, it curled over and fell in a dense cloud to the ground on the north side, forming a sand-bank [from the amount of admixed sand], over which the olive-coloured oil ran in innumerable channels towards the lakes of petroleum that had been formed on the surrounding estates. . . . Standing on the top of the sand-shoal, we could see where the oil, after flowing through a score of channels from the ooze, formed in the distance, on lower ground, a whole series of oil lakes, some broad enough and deep enough to row a boat in. Beyond this, the oil could be seen flowing away in a broad channel towards the sea."

Flowing wells yielding from 40,000 to 160,000 gallons of oil daily are common in Baku, and the ordinary yield obtained by pumping is from 10,000 to 25,000 gallons daily; and many of these pumping wells have been worked for years without any diminution in the supply. A well belonging to Gospodin Kokereff had up to the

date of Mr. Marvin's book produced 60,000,000 gallons of oil, and the supply showed no sign of decreasing. The waste occasioned by "spouting" is at times enormous; millions of gallons of oil being lost from the want of any storage accommodation. Occasionally the neighbouring proprietors who happen to have reservoirs empty may thus obtain the oil at a nominal price. On one occasion 2,000,000 gallons were sold at about $7\frac{1}{2}d.$ per ton. When the Drojba fountain "spouted," the crude article, we are told, altogether lost its value for the moment.

"Fedoroff filled his reservoirs with 2,800,000 gallons of oil for 300 roubles, or £30. . . . Thousands of tons were burnt outside the district to get rid of it; thousands were led towards the Caspian; huge lakes of oil were formed near the well, and on one occasion the liquid suddenly flowed into a distant engine-house, and but for the promptness of the engineer in extinguishing his petroleum furnace the whole locality would have been ablaze. Houses were completely buried by the sand cast up by the oil; all efforts to stop the fountain on the part of Baku experts were fruitless."

After great exertions on the part of the well owners of the district, the fountain was eventually gagged, but not before 500,000 tons of oil had "spouted," equal to a loss at the current value of American petroleum of upwards of £1,000,000 sterling. But the record of the Drojba fountain was beaten in 1886, when a single well "spouted" as much as 11,000 tons of petroleum per diem; an amount equal to the aggregate daily yield of the 25,000 wells of America, the thousands of wells in Galicia, Roumania, and Burmah, and the shale oil distilleries of Scotland and New South Wales. As a result the market is now glutted, and the crude oil has been selling at times at the rate of fifty gallons for a penny!

We have not space to indicate all the many points of Mr. Marvin's interesting narrative, or to do justice to his account of the economic results which he thinks must inevitably follow from the prodigious source of wealth which Russia possesses in this wonderful district. It must be remembered that petroleum ton for ton is more potent than coal as a source of power. Hundreds of immense floating cisterns driven by petroleum furnaces are carrying this fuel across the Caspian and up the Volga, to be spread throughout Russia and Germany, and along the Baltic coasts. We learn from a recent Consular Report that pipe lines are being laid from Baku to Batoum: the Caspian and Black Sea Naphtha Conduit Company has now been formed, and the line is to be laid within the next four years. The conduit is to have a forked line on the Black Sea, reaching Batoum and Poti, and the capacity of the line is such as to admit of the daily passage of 1,200,000 gallons of naphtha. In a few years, therefore, this petroleum fuel will be scattered along the Mediterranean coasts and through Southern Europe. Possibly we may have it burning in our own Underground Railway before long. Indeed, as Mr. Marvin tells us, we shall surely see the Parsee back again at Baku, not to worship the Everlasting Fire, but for the purpose of buying lamp oil for the bazaars of India. What the effect of this intercourse will be on the future of India time will show. Meanwhile Russia is steadily making her way towards the gates of India, and Tchernayeff's road to Central Asia will be an accom-

plished fact before many years are past; and since the discovery of the new springs near the Mervi Kultuk Bay, the railway to Khiva will possess its own supply of fuel. A few days ago Mr. G. Curzon read an interesting paper to the Royal Geographical Society on the Transcaspian Railway, which must have opened many people's eyes to the development of Russia's power in Central Asia. In the meantime what are we doing with the sources of wealth in petroleum which we possess in Upper Burmah? Along the valley of the Irrawadi, and within 60 miles of the Rangoon-Prome railway, are enormous deposits of petroleum, probably as copious as those of America, if not so rich as those of Baku, and certainly capable of supplying the whole of India with light and fuel. Perhaps those capitalists who are so eager to rush into the ruby mines of Burmah might more profitably devote their wealth to exploiting the petroleum springs of that country, for it needs not the gift of prophecy to assert that Burmese petroleum in the long run will be certainly more precious than Burmese rubies.

We can heartily commend Mr. Marvin's book to all who are interested in the Central Asian question, for, as he says in the outset, petroleum is bound to become an important factor in that problem. Hannibal was said to have dissolved the Alps by vinegar. It is far more likely that petroleum will dissolve the sort of Chinese wall that our Governments are feebly setting up to keep the Russian trader and the *tchinovnik* out of India.

T. E. THORPE.

A TEXT-BOOK OF ELEMENTARY BIOLOGY.

A Text-book of Elementary Biology. By R. J. Harvey Gibson, M.A., F.R.S.E., Lecturer on Botany, University College, Liverpool. (London: Longmans, Green, and Co., 1889.)

THE above-named work is one of those which, as has been remarked in these pages (vol. xxxviii. p. 52), "the system of examining the whole world on a limited schedule . . . is bound to produce," and the essence of it is devoted to a consideration of those type-organisms which the examining body have set down for study. It contains 345 pages small octavo, and is divided into eight chapters, with an introduction. The first three chapters are devoted to generalities, and the last one to a "history of biology."

The author decries the "evils of the cram system," and proceeds at once to assert that "this must be my apology . . . for the introduction of so many speculations and explanations of casual relationship," while he claims for his treatise the special distinction that it deals "with the relationship of botany to zoology, and of both to the fundamental sciences of physics and chemistry." In fulfilling this determination the author gives, at the outset, a physico-chemical *résumé*. We regard the whole of this as out of place and superfluous, inasmuch as University students (for whom the book is written) will, if properly trained, have received the same information in a more tangible and authoritative form, at the hands of Professors of the special subjects. We strongly deprecate this growing tendency towards usurpation of the functions of others, especially when it